

## REMARKS

The Office Action of August 21, 2007, has been received and reviewed.

Claims 1-29 were previously pending and under consideration in the above-referenced application, each standing rejected. Claims 1 and 25 have been revised. Claim 24 has been canceled. These amendments to the above-referenced application are made without prejudice or disclaimer.

Reconsideration of the above-referenced application is respectfully requested.

### Rejections under 35 U.S.C. § 102

Claims 1-8 and 19-29 stand rejected under 35 U.S.C. § 102(e) for reciting subject matter that is allegedly anticipated by the subject matter described in U.S. Patent Application Publication 2003/0171456 of Tong et al. (hereinafter “Tong”).

A claim is anticipated only if each and every element, as set forth in the claim, is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

With respect to inherency, M.P.E.P. § 2112 provides:

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) . . . ‘To establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill . . .’’ *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1991).

Tong describes a cureable underfill encapsulant material for application on semiconductor wafers. *See, e.g.*, paragraph [0013]. The encapsulant material described by Tong is a B-stageable composition made up of one or more epoxy resins, an imidazole-anhydride adduct, and at least one solvent. *See, e.g., id.* Tong describes applying and initially curing the

encapsulant material on a semiconductor wafer. *See, e.g., id.* The temperature and length of the initial cure are important, as they must be tailored to prevent overcuring of the B-stageable composition. Paragraphs [0031] and [0032]. The glass transition temperature ( $T_g$ ) of the B-stageable material is also very important, as it must be tailored to facilitate clean dicing of the material once the material has been partially cured, or “B-staged.” Paragraph [0033]; TABLE 4. Tong notes that a B-staged material that is “cleanly diced” does not stick to a wafer saw and has no cracks. Paragraph [0033].

Tong also describes a final cure performed on the encapsulant material after formation of interconnections by solder reflow. *See, e.g.,* paragraphs [0025] and [0026]. The final cure is not effected until the semiconductor die is positioned over a substrate with the B-staged material positioned between the semiconductor die and the substrate. *Id.*

Independent claim 1, as amended and presented herein, recites a method for forming a protective layer on a plurality of semiconductor device components. The method of amended independent claim 1 includes, among other things, subjecting at least the protective material to conditions that will heal cracks and delaminated areas that were formed as the components were severed. After the protective material is subjected to such conditions, and before the resulting semiconductor device is assembled with another component of an electronic device, the protective material is fully cured.

It is respectfully submitted that Tong does not expressly or inherently describe subjecting at least a protective material to conditions that will heal cracks and delaminations produced during semiconductor dicing. Rather, Tong merely describes that the B-stageable material is formulated so as to have a glass transition temperature that allows it to be “cleanly diced” once the material has been B-staged; *i.e.*, that the material will not stick to the dicing saw or crack or break when sawed. Paragraph [0033]. A “cleanly diced” B-staged material would, therefore, include no cracks. Since Tong describes that there are no cracks or breaks in B-staged material following the dicing process, there are no cracks or breaks to heal.

Moreover, it is respectfully submitted that Tong does not describe circumstances in which healing would occur, or conditions in which healing would inherently occur. Rather, the description of Tong is merely limited to application of a B-stageable material to a semiconductor

wafer (*see, e.g.*, paragraph [0013]), partially curing the B-stageable material by removing solvent therefrom (*see, e.g.*, paragraph [0013]), dicing the partially cured material and the wafer (*see, e.g.*, paragraph [0013]), and assembling a semiconductor device that has been coated with the partially cured B-stageable material face-down over a substrate before the B-stageable material is fully cured (paragraphs [0025] and [0026]).

Because Tong does not expressly or inherently describe healing cracks and delaminated areas in a protective material, Tong does not anticipate each and every element of independent claim 1.

Moreover, it is respectfully submitted that Tong provides no express or inherent description of a method in which a B-stageable material is fully cured before a semiconductor device is assembled with another component of an electronic device. To repeat: the description of Tong is limited to fully curing a coating of B-stageable material only after the B-stageable material is presented between a semiconductor device and a substrate. Paragraphs [0025] and [0026].

Therefore, it is respectfully submitted that, under 35 U.S.C. § 102(e), independent claim 1 recites subject matter which is allowable over that described in Tong.

Each of claims 2-8 and 19-29 is allowable, among other reasons, for depending either directly or indirectly from claim 1, which is allowable.

Claim 8, which also depends from claim 5, is further allowable since Tong lacks any express or inherent description of applying the protective material such that the protective material is spaced apart from a base portion of at least one conductive structure.

Claim 25 is additionally allowable because Tong neither expressly nor inherently describes singulating semiconductor devices from a fabrication substrate once the material of a protective layer on the semiconductor devices has been singulated, then fully cured.

Claim 28 is further allowable because Tong includes no express or inherent description of healing the protective material by heating at least portions of a thermoplastic material located over peripheral regions of the adjacent semiconductor device components following severing and at least partially severing.

Withdrawal of the 35 U.S.C. § 102(e) rejections of each of claims 1-8 and 19-29 is respectfully solicited, as is allowance of these claims.

**Rejections under 35 U.S.C. § 103(a)**

Claims 9-18 stand rejected under 35 U.S.C. § 103(a) for reciting subject matter which is assertedly unpatentable over that taught in Tong in view of teachings from U.S. Patent 6,650,019 to Glenn et al. (hereinafter “Glenn”).

The standard for establishing and maintaining a rejection under 35 U.S.C. § 103(a) is set forth in M.P.E.P. § 706.02(j), which provides:

There are several requirements in establishing a *prima facie* case of obviousness against the claims of a patent application. All of the limitations of the claim must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 985 (CCPA 1974); *see also* MPEP § 2143.03. Even then, a claim “is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR Int’l Co. v. Teleflex Inc.*, No. 04-1350, slip op. at 14 (U.S. April 30, 2007). The Office must also establish that one of ordinary skill in the art would have had a reasonable expectation of success that the purported modification or combination of reference teachings would have been successful. *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). There must also be an explicit, articulated “reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements” in the manner claimed and provided the person of ordinary skill with a reasonable expectation that the combination or modification of the prior art would have been successful. *KSR*, slip op. at 5; *see also*, *KSR*, slip op. at 14. That reason must be found in the prior art, common knowledge, or derived from the nature of the problem itself, and not based on the Applicant’s disclosure.

*DyStar Textilfarben GmbH & Co. Deutschland KG v. C. H. Patrick Co.*, 464 F.3d 1356, 1367 (Fed. Cir. 2006); M.P.E.P. § 2144. A mere conclusory statement that one of ordinary skill in the art would have been motivated to combine or modify reference teachings will not suffice. *KSR*, slip op. at 14.

Claims 9-18 are each allowable, among other reasons, for depending directly or indirectly from claim 1, which is allowable.

It is also respectfully submitted that the teachings of Tong and Glenn do not support a *prima facie* case of obviousness against any of claims 9-18.

In this regard, it is respectfully submitted that, without the benefit of hindsight that the above-referenced application provides to the Office, one of ordinary skill in the art wouldn't have had any reason to expect that teachings from Tong and Glenn could be combined in the asserted manner. This is because, when the teachings of Tong and Glenn are considered in their entireties, as required by M.P.E.P. § 2141.02, the packaged semiconductor devices disclosed in Tong and Glenn are not interchangeable. The teachings of Tong are limited to use of B-stageable materials as underfill between semiconductor devices that are flip-chip bonded to substrates with solder balls that extend directly between bond pads of the semiconductor device and corresponding terminals of the substrate. *See, e.g.*, paragraphs [0025] and [0026]. The teachings of Glenn are, in contrast, limited to stacked semiconductor device assemblies in which the backside of a semiconductor device is positioned against a substrate and leads electrically connect bond pads of the semiconductor device and correspondence terminals of the substrate. *See, e.g.*, FIGs. 3-8.

For these reasons, it appears that one of ordinary skill in the art wouldn't have been motivated to combined teachings from Tong and Glenn in the asserted manner without the benefit of hindsight provided by the claims and disclosure of the above-referenced application.

Therefore, is respectfully submitted that the asserted combination of teachings from Tong and Glenn does not support a *prima facie* case of obviousness against any of claims 9-18 of the above-referenced application.

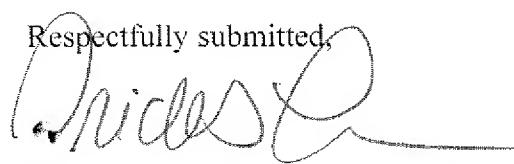
Withdrawal of the 35 U.S.C. § 103(a) rejections of each of claims 9-18 is respectfully solicited, as is the allowance of these claims.

## **CONCLUSION**

It is respectfully submitted that each of claims 1-23 and 25-29 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing

allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



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